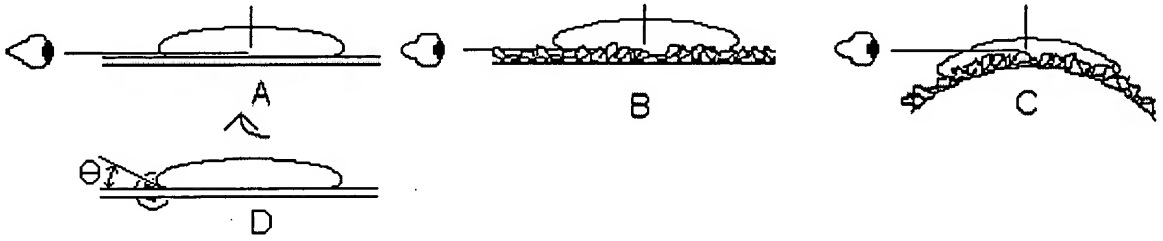
REMARKS

This paper is in response to the Final Office Action dated June 16, 2005. Claims 1-14 are pending. Claims 1 through 8 appeared in the Application as filed on 2/25/2004 and Claims 9-14 were added in response to the Office Action of 2/10/2005. Claims 1 and 6 were amended in response to the Office Action of 2/10/2005. Claims 9-14 were allowed. Claims 1-4, 6 and 7 were rejected and Claims 5 and 8 were objected to. Claims 1, 5, 6, 8, 9 and 13 are amended. Claims 15-18 are new dependent claims.

A brief review of the Applicants invention may be helpful. The invention is directed to the determination of the wettability of a particulate surface. Particulate surfaces are extremely difficult to determine wettability by normal methods. The traditional method of determining the wettability of a material is to place a flat sheet of the material on a level table and to place a drop of a liquid on the surface and then photograph the drop from an angle of 0 degrees to the plane of the sheet such that the interface of the surface and the liquid drop appear as a straight line which separate into an upward deflected curved line for the liquid drop above the straight line of the surface. Typically the photo is enlarged so that the angle of intersection between the flat surface and curved liquid drop, the contact angle, can be measured. Although the more universally applicable mode of insertion of the curved surface into a test liquid to measure a contact angle is illustrated and described in the present application rather than observation of a liquid drop discussed and illustrated here, the problems of line of sight are the same. The liquid drop illustration is being used here as it is often more rapidly appreciated by one introduced to the concepts of wettability and is more easily illustrated. In the illustration below, A represents a smooth surface. The line, which appears as its vertical projection below in A, B, and C, indicates where the point at which the solid-liquid interface begins and intersects with the solid surface and defines the contact angle θ. As viewed with a 90 degree clockwise rotation of A to give D the contact angle is apparent. Since it is a smooth surface, the line of sight, which extends from the eye and is perpendicular to the plane defined by the contact angle, is unimpeded. In contrast, as illustrated in B, a particulate surface obscures the direct line of sight by many particles encountered between the position of the observer or observation device and the vertex of the contact angle. The present invention uses a solid particulate substrate on a convex surface and a liquid drop equivalent, as shown in C. The curvature solves the line of sight problem as the particulates are bent away from the line of sight. Claims 1, 5, 6, 8, 9 and 13 are amended to

include the importance of having a convex surface which permits an unimpeded line of sight so that a measurement can be made. Claims 15-18 are added, reciting the observation on the line of sight which is tangential to the curved surface. These features are illustrated in Fig. 3 of the present application and described in paragraph [0033] which show and discuss the image one observes on this line of sight.



In the Final Office Action the Examiner concluded:

> **Claims 1-3, 6, and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Gutoff (US 4,275,587). Gutoff discloses the claimed invention, a method and system for determining wettability of a substrate coated with a particulate gelatin coating. Gelatin consists of particulate colloid material. The coated substrate is inserted into a test liquid forming a liquid meniscus which is optically analyzed to determine the meniscus height and therefrom to calculate the wettability of the surface. The test device has many cylindrical surfaces (Figure 1); in particular, the measurement surface is forced into a partially cylindrical shape when interacting with cylinders 11 and 12. See abstract, column 3, column 6, and column 10 lines 23-29.**

Gutoff discloses a method and apparatus directed to the measurement of dynamic wetting angles for a continuous film drawn through a fluid. Gutoff's method is a dynamic method and can only achieve the measurement of a static wetting angle by extrapolation of dynamic measurements to zero belt velocity. In contrast, the method of the present invention is designed to measure directly either static or dynamic wetting angles. The present invention is directed to a method for solving the need to determine wettability of particulate surfaces. The present invention provides the particulate surface in a convex shape. The use of a convex surface has significant advantages. Even though not flat, the present invention has one dimension of the

particulate surface constrained to a line so that the contact angle can be defined relative to that line. This line is the edge of the cylinder parallel to the central axis illustrated in Figure 3 in the specification. It is the ability to observe this line, without disruption of the line of sight by coplanar particles, that distinguishes the present invention.

Gutoff does not describe or claim a method or apparatus for use with particulate materials. Furthermore, the design of Gutoff's apparatus would not be reliable for particulate surfaces for the reasons enunciated above. Figure 1 of Gutoff illustrates the point of analysis of the surface and no curved substrates are illustrated. Only the liquid is curved in Figure 1, which is a physical necessity of all liquid-solid gas interfaces. Gutoff shows in Figure 2 a flexible flat belt, referred to as a web, which is pulled through a series of rollers, referred to as guides, into a liquid and out of the liquid such that a section of the belt is stretched between a roller in the liquid and a roller in the gas above the liquid to provide a flat surface at the interface of the liquid and the gas. These curved rollers and the belt going over them are not in the area where observation of the meniscus is made. An optical device or an observers eye is used to observe the meniscus, illustrated in Figure 1 of Gutoff, and measure the contact angle. As shown in Gutoff's Figure 5, a flat surface is required by his optical system. Hence the surface that is observed is exclusively flat and cannot be cylindrical where the observation of the interface is made due to the geometry imposed on the belt. This geometry is imposed on the belt by the two cylindrical rollers before and after the area for observation. The cylindrical rollers are not present to impose curvature, rather they are used to force a flat surface at the site of observation of the meniscus.

Furthermore, the use of Gutoff's apparatus would not permit the examination of particulate surfaces with precision and reproducibility. The action of drawing a web with particulates attached to the surface over the guides of the apparatus would degrade a particulate surface due to the expansion and compression imposed on the particulate surface while is flexed in opposite directions while it is passed over and under the rollers. Inconsistent results for particulate surfaces would be the norm for this apparatus due to the induced degradation of the particulate surface. Hence, the nature of the design teaches away from examining particulate surfaces.

The Examiner cites Gutoff's description on Column 10 Lines 28-9 of "a 16 mm web of polyester coated with gelatin" as evidence that a particulate surface was described. Gutoff does not describe the gelatin as particulate. The Examiner characterizes the gelatin coating as being particulate but gives no justification to define the gelatin coating as particulate in nature. The Examiner is required to give justification of the inherent equivalency of the gelatin coating of Gutoff and the particulate surfaces of the present invention to meet the requirement of MPEP 2112 IV, copied below:

MPEP 2112 IV. <EXAMINER MUST PROVIDE RATIONALE OR EVIDENCE TENDING TO SHOW INHERENCY The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' " *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted)

Applicant traverses the statement that gelatin consists of particulate colloidal material. The Merck Index, 12th Edition defines gelatin as "Gelfoam; Puragel", which it then describes as a "colorless or slightly yellow, transparent, brittle, practically odorless, tasteless sheets, flakes or coarse powder". Gelatin can exist as particles in a dry state as flakes or coarse powders, but this is only due to a process of breaking the solid polymer into small pieces as can be done with virtually all solid materials. There is no work or phrase in Gutoff that states that any surface disclosed was of particulate form. From what is disclosed in Gutoff, it is not reasonable to believe the gelatin was particulate, rather it is necessary to assume that the gelatin coated polyester web has a smooth surface. The process of coating the gelatin on the web would necessarily require the use of the polymer in solution, which would then leave a smooth surface on the web. Using a gelatin coating to give a smooth surface is a common practice in the photographic film industry, which is the industry of the assignee of Gutoff, the Polaroid Corporation. The device of Gutoff's invention was intended for smooth surfaces such as photographic film. The word particulate or any synonym of particulate can not be found in Gutoff. No disclosure to the use of a particulate surface was given in Gutoff's Abstract, within Columns 3 or within Column 6. Claims 1-3, 6 and 7 of the present invention are not anticipated

by Gutoff, which does not describe or imply a method for measuring the wetting of particulate surfaces, and Claims 1-3, 6 and 7 should be allowed.

Examiner determined:

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gutoff (US 4,275,587) in view of Fukunaga (US 5,815,256). Gutoff teaches the claimed invention except for optical meniscus profiling. Fukunaga teaches optical meniscus profiling to determine the wettability of an immersed substrate; see Figures 4-8, 12, 15, 16, column 9, and columns 15-16. It would have been obvious to use profiling as taught by Fukunaga in the invention taught by Gutoff to analyze the meniscus, since this is shown to present a fuller depiction of the wettability of the entire substrate area.

Fukunaga teaches a device to map the surface free energy distributions over a large flat sheet. Claim 4 of the present invention is directed to the use of a measurement of an external meniscus profile. Devices, portions of the device, or geometries of elements of a device to map the surface energy profile of a flat sheet are displayed in Figures 4-8, 12, 15, and 16 of Fukunaga. A device necessarily for the observation of an external meniscus profile using an optical method is not displayed in Fukunaga in Figures 4-6, 12, 15, or 16. However, a portion of a device to measure the shape of meniscus is displayed in Figure 11 and the geometry of the optical paths required to observe the shape of a meniscus with two different detector types are given in Figures 7 and 8. Observing the shape of the meniscus could be considered consistent with the definition of optical meniscus profiling although Fukunaga does not use the term profiling. The use of a measurement of an external meniscus profile of a particulate surface to assess its wettability constitutes the novelty of Claim 4 in the present invention and Fukunaga teaches away from particulate surfaces. Fukunaga describes the problem to be solved in the Background of the Invention, Column 1 Lines 18-36, in the following manner: *When manufacturing a semiconductor device or a liquid crystal display the control of wettability of the surface of a substrate in every treatment, such as a washing treatment, a surface treatment, coating and removing treatments of a resist, is a very important requisite for obtaining a desired device structure and characteristics. For example, when a large number of semiconductor*

devices are arranged on a large scale substrate as in a process of forming TFTs in manufacture of a liquid crystal display, the assurance of ***uniformity in in-plane distribution of wettability is considered to be essential.*** *A liquid crystal cell used in a liquid crystal display for a personal computer or a television is featured in principle in that the liquid crystal is aligned in a proper direction by controlling the surface condition of the alignment layer. The quality of the display image relates to the alignment uniformity of the liquid crystal, and the alignment uniformity relates to the uniformity of surface free energy. Therefore, it is an important subject matter to assure the uniformity of surface free energy.* Uniformity of in-plane distribution requires a flat surface, hence his invention excluded the teaching of a particulate surface. Column 9 describes optical methods for observing the meniscus that on Lines 19 and 20 describe the measuring of the shape of the meniscus for a flat surface. All independent claims in Fukunaga distinctly state that the means are to obtain two dimensional information or in-plane distribution which necessarily define a flat system. The combination of Gutoff, as it does not teach the claimed invention, with Fukunaga, which teach away from the investigation of particulate surfaces, can not render Claim 4 obvious and Claim 4 should be allowed.

Dependent Claim 5 was combined with Independent Claim 1 resulting in Independent Claim 9 which was allowed. Dependent Claim 8 was combined with Independent Claim 6 resulting in Claim 13 which was allowed. These claims have all been amended to included the important convex surface of the test device.

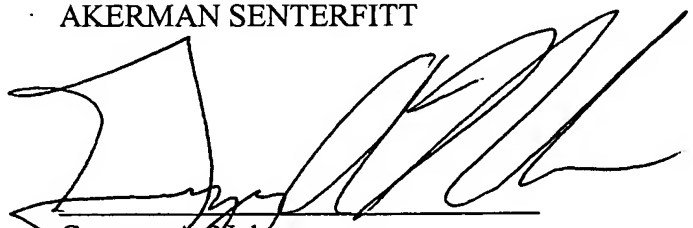
Examiner accepted the drawings filed on 2/25/04 but applicants respectfully request that new drawings be accepted for Figures 1 and 4. The new drawings are supplied because the text of the present invention refers to features in the drawings by number. Numbers are absent in the previously supplied figures. No new numbers are added to the specifications. The descriptions in the text of the specification is sufficient to properly determine the features of the drawings given the specific number. The numbers were added to the drawings for greater ease in examining the figures.

Applicants have made every effort to present claims that distinguish over the cited art, and it is believed that all claims are in condition for allowance. However, Applicants invite the Examiner to call the undersigned if it is believed that a telephonic interview (direct line (561) 671-3656) would expedite the prosecution of the application to an allowance. A fee for extension for response within two month is believed to be due, the Commissioner for Patents is

hereby authorized to charge any deficiency in fees due or credit an excess in fees with the filing of the papers submitted herein during prosecution of this application to Deposit Account No. 50-0951.

Respectfully submitted,

AKERMAN SENTERFITT



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